ORIGINAL ARTICLE

LATRINE USE AND ASSOCIATED FACTORS AMONG RURAL COMMUNITY IN INDONESIA

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ABSTRACT

Indonesia is the second-most-populated country still practicing open defecation. The low utilization of latrines is a big problem that can affect human health and the environment. Several sub-districts in Tanggamus Regency have the lowest reported use of a latrine. This study aimed to determine associated factors of latrine usage in Tanggamus Regency in 2017.. A cross-sectional study was conducted among 399 households in Tanggamus Regency, Lampung. Sampling was proportional to the total number of household in 20 sub-districts. Respondents were interviewed by a structured questionnaire . Data were analyzed using SPSS version 18.0. The study observed that a majority (55.6%) of the respondents used a latrine; furthermore, more than half of all respondents indicated good knowledge (55.9%), positive attitude (57.4%), good economic status (56.1%), access to a proper latrine (57.6%), good support from health office (55.4%), and availability of clean water (53.4%). Multivariate analysis showed that attitude was the most dominant factor related to the utilization of latrine (P<0.05 and adj OR=3.2). Encouraging communities to translate their positive attitudes into the behavior was very important. Policies, community leaders, and heads of households should all be influenced to change community attitudes to drive consistent latrine use.

Keywords: Latrine Use, Open Defecation, Tanggamus Regency

INTRODUCTION

Sanitation is a basic human right, but an estimated 2.4 billion people still lack adequate sanitation facilities[1,2]. Lack of sanitation harms health, especially diarrhoea[3-5]. Each year diarrhea kills 1.5 million children under five years of age[6]. Most diarrhea cases occur in low-income countries[7-9]. Diarrhea remains one of the major health issues in Indonesia, with around 4,017,861 cases handled in health facilities in 2015. Lampung Province has the fifth largest number case fatality rate of diarrhea cases (7,14%)[10]. Previous studies also have reported that open defecation can statistically account for height difference in child[11,12].

There have been several studies in the literature reporting that improving basic sanitation can reduce the number of diseases significantly[13,14]. Therefore, the Ministry of Health has issued a regulation on Community Based Total Sanitation (CBTS) as a national strategy for sanitation development in Indonesia. There are five pillars in CBTS, but the government and the world are still focusing on completing the first pillar (stop open defecation) because one of eight people around the world (946 million) still practicing open defecation[15]. Many studies were conducted in India on open defecation because India is the most-populated country practicing open defecation[16,17]. The behavior of open defecation will affect the quality of life of millions of people in the future[18].

Unfortunately few studies have been carried out on open defecation in Indonesia[19], even though Indonesia is the second-most-populated country (more than 51 million) still practicing open defecation[20]. In Province Lampung, an estimated 249,274 households practice open defecation due to lack of latrine. Open defecation mostly affects the poor and rural communities[21]. The area chosen for this study was the Tanggamus Regency, a rural area in which an estimated 36% of households are still practicing open defecation[22].

Whereas most studies conducted on this topic have focused on establishing latrine coverage levels, there is an apparent gap in the investigation literature of the underlying factors that lead to those low latrine-coverage levels, especially in a rural area like Tanggamus Regency. Therefore, this study set out to determine associated factors of latrine use among the rural community members of Tanggamus Regency. It is necessary to understand the factors associated with latrine use in Tanggamus Regency to accelerate the CBTS program effectively. To answer the objective of this study, a cross-sectional study was conducted

with a total of a sample of 399 households distributed across 20 sub-districts in Tanggamus Regency.

METHODOLOGY

Study design and sampling procedure
A quantitative study with a cross-sectional approach was conducted to determine factors associated with latrine use. The population of this study was drawn from the 592.978 total households in Tanggamus Regency. For a 95% confidence interval, the minimum required sample size for this study using Slovin formula [23] :

$$n = \frac{N}{1 + N(d)^2}$$

Where :
n = required sample size
N = Population size
d = precision (0.05)

Based on the calculation, A total of 399 households were required to get a plausible result. The samples were distributed across all 20 sub-districts or villages in Tanggamus Regency using proportional random sampling. Sub-district involved in this study such as Gisting (26 respondent), Ulu Belu (27 respondent), Pulau Panggung (24 respondent), Sumberrejo (20 respondent), Semaka (22 respondent), Gunung Alip (11 respondent), Air Naningan (20 respondent), Kota Agung Barat (8 respondent), Bandar Negeri Semuong (6 respondent), Talang Padang (31 respondent), Pematang Sawa (17 respondent), Bulok (11 respondent), Wonosobo (28 respondent), Cukuh Balak (15 respondent), Kelumbayan Barat (8 respondent), Kota Agung Timur (14 respondent), Kota Agung (19 respondent), Pugung (76 respondent), Kelumbayan (7 respondent) and Limau (10 respondent).

Sub-districts with the higher population densities were samples at proportionally higher rates. After determining the number of samples required per sub-district, purposive sampling was conducted by prioritizing household in poverty pocket. All respondents have explained the meaning and the purpose of this research before finally asking them to sign an informed consent agreement. Heads of families who were not willing to sign the informed consent were not included in the research sample. This research was conducted on the heads of families over the age of 18 years. Also, houses that were hard to reach due to their difficult geographic locations were not included in the research. A total of 399 households were visited in June 2017. This research was carried out by 20 trained enumerator in each sub-district. If the files were incomplete, it could be cross-checked using a

respondent's identity, which is like a phone number and address. Of the 399, estimated around 222 of the households used a latrine for defecation and 177 households did not use a latrine.

Instrument development and data collection procedure

A structured questionnaire (one per household) was designed to collect quantitative data relevant to the objectives of the study. The questionnaire was developed based on Lawrence Green's theory that knowledge, attitudes, beliefs, and traditions are the primary factors influencing health-related behaviors, and previous studies[24]. The questionnaire was divided into seven sections in line with the study objectives. Part A was about socio-demographics such as age, gender, education, and occupation. Part B was about socioeconomic status. Part C consisted of 11 questions to measure the knowledge of respondents about the importance and benefit of using latrines. Part D was about attitudes toward latrine use and consisted of 12 items. Part E was about latrine conditions and consisted of 4 questions, modified from the RISKESDAS 2013 questionnaire[25]. Part F was about the availability of clean water consisted of 2 questions and part G was about latrine use consisted of 1 item.

The knowledge category was divided into 'good' and 'bad,' where the level of knowledge was considered 'good' if the respondent answered more than 76% of the questions correctly. The attitude category was divided into 'positive' and 'negative,' which identified a respondent a having a positive attitude if the T score $\geq$ 50. The respondents' economic status category said 'enough' if the total monthly household income was more than US$100. Concerning the division of clean water supply and support of official health, the response said 'good' if the respondent's value was more significant than the mean/median.

Validity and reliability considerations were made to ensure that the research truly measured the desired information. A pre-test to check the validity and reliability of the research instrument was undertaken on 30 households in Pringsewu Regency with the aim of reviewing the questionnaire for clarity, consistency, and relevance of the questions. The validity and reliability test was used to correct and clarify ambiguous questions, ideas, and statements in the data collection instrument. The resulting questionnaire was found to be valid and reliable for use in this research.

The validity test conducted with 30 heads of families in Pringsewu Regency specified that concerning the knowledge variable, yielded the following results. The (Cronbach-alpha) test for the variable 'knowledge' resulted in r value counts from the 11 relevant questions that fell between 0.704 and 0.865; the values were tested against $r_{count} > r_{table}$ at df = n-2 = 28, and if the dk 95% is as big as r 0.374, it could be concluded that all of the questions on the 'knowledge' variable was valid. The test for the variable 'attitude' resulted in r value counts from the 11 relevant questions that fell between 0,400 and 0,946; the values were tested against $r_{count} > r_{table}$ (0.374), and it was concluded that all of the questions on the 'attitude' variable was valid.

A validity test for the 'latrine condition' variable was composed of 4 questions; the 'clean water supply' variable was composed of 3 questions, and the variable of 'official health support' was composed of 8 questions. These resulted in a r_{count} value between 0.384 and 0.777; all of the questions relating to the 'latrine condition' variable, 'clean water supply' variable, and 'support' variable follow $r_{count}>r_{table}$ value, so it was concluded that all of those questions were valid.

After the validity tests, the reliability test was performed for every question, confirming that the results measured would be truthful or dependable. For this reliability test, we used the Cronbach Alpha method[26]. The result of reliability test on the 'knowledge' variable was 0.945; on the 'attitude' variable 0.955; one the 'latrine condition' variable 0.742; on the 'clean water supply' variable 0.815; and on the 'support of official health variable' 0,969. All of the variables resulted in Cronbach alpha value > r table on df = n-2 = 28, and if the dk 95% was as big as 0.374 r), it could be concluded that all of the variables research questions were reliable.

Ethical Considerations

This research was granted permission by the district health office in Tanggamus Regency and Malahayati University. All respondents have explained the objectives of the study and secured written informed consent from participants prior to data collection. Ethics clearance was obtained from Ethics Committee Poltekkes Tanjung Karang with the study protocol code of 01/EC/KEP-TJK/I/2018.

Data Processing and Analysis

All field questionnaires were first checked for the truthfulness and completeness, then coded and entered into the computer software and cleaned before data analysis. The descriptive findings for the study are presented in the form of numerical summaries, tables, and charts. Chi-square test was used to measure the association between the dependent and independent variables and binary logistic regression was used to know the most dominant variable.

RESULTS

Sociodemographic and latrine-use characteristics

Overall, a total of 399 respondents participated in the study. Socio-demographic variable included: age, gender, education, and occupation. Socio-demographic characteristics of respondents are shown in Table 1 and indicate frequency, mean, and standard deviation with a 95% confidence interval. The mean (SD) age of the respondents was 38.49 (7.86) years, with a minimum of age of 23 years and a maximum of the age of 60 years. Most of the respondents (64.7%) were male, while the rest (35.3%) were female. Around 65.7% of the respondents had completed their senior year of high school; 18.3% had a complete elementary school education, and 11.8% had graduated from junior high school. Most of the respondent (43.1%) work as traders, followed by farmers (35.6%) and factory worker (20.3%). Latrine-use characteristics of the respondents can be seen in Table 1.

Overall, 55.9% of the respondent displayed a good knowledge of the importance of latrines. More than half (57.4%) of the respondents had a positive attitude toward the use of latrines. More respondents (56.1%) had good economic status than respondents who had a severe economic status. More than half (57.6) of the respondent had a good latrine. The number of latrines with good availability of clean water (53.4%) was higher than those without the availability of clean water. A majority (55.4%) of the health workers in the study area gave good support toward the use of latrines to defecate.

Table 1: Socio-demographic and latrine-use characteristics of the respondents (n=399)

Variable	Frequency (N)	Percentage/ Mean (SD)	95% CI Lower Limit	Upper Limit
Age (SD) in years	399	38.49 (7,86)	37.71	39.26
Gender				
Male	258	64.7	59.9	68.9
Female	141	35.3	31.1	40.1
Education				
Elementary School	73	18.3	14.5	22.1
Junior High School	45	11.3	8.0	14.3
Senior High School	262	65.7	61.2	70.2
Bachelor	19	4.8	2.8	7.0
Occupation				
Unemployed	2	0.5	0.0	1.3
Laborer	81	20.3	16.5	24.1
Entrepreneur	172	43.1	38.3	47.9
Farmer	142	35.6	30.8	40.4
Government Employees	2	0.5	0.0	1.3
Knowledge Level				
Good	223	55.9	51.1	60.7
Bad	176	44.1	39.3	48.9
Attitude				
Positive	229	57.4	52.6	62.2
Negative	170	42.6	37.8	47.4
Economic Status				
Less than US$100 per month	175	43.9	39.1	48.9
More than US$100 per month	224	56.1	51.1	60.9
Latrine Condition				
Good	230	57.6	52.9	62.7
Bad	169	53.4	37.3	47.1
Availability of Clean Water				
Available	213	53.4	48.4	58.1
No available	186	46.6	41.9	51.6
Health Officer Support				
Support	221	55.4	50.1	60.2
No Support	178	44.6	39.8	49.9

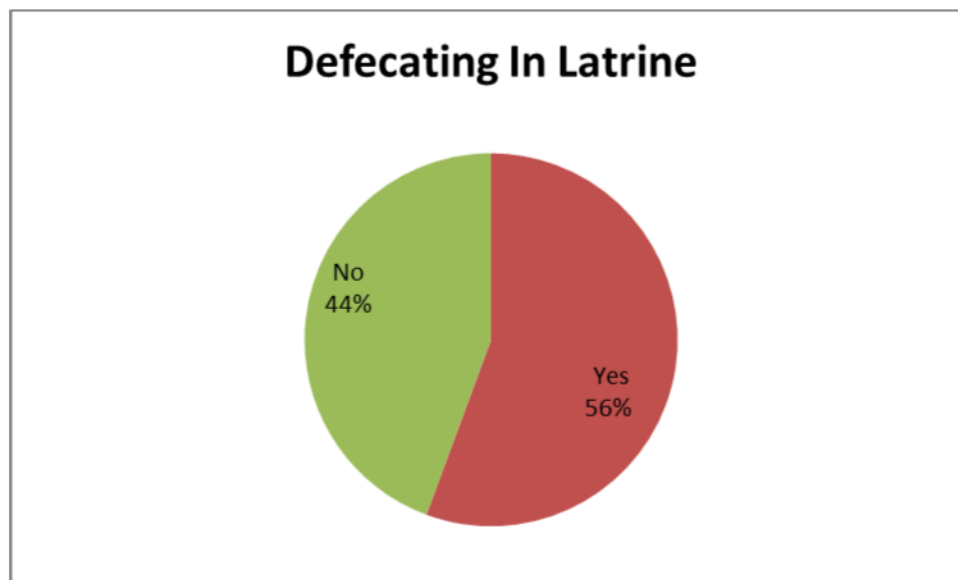*SD : Standard Deviation, CI : Confident Interval*

Figure 1. Using The Latrine Versus Never Using The Latrine

The pie chart indicates that among 399 respondents, a majority (55.6%) of the respondents used a latrine, compared to those (44.4%) who did not use the latrine (Figure 1).

Table 2: Independent variables associated with latrine use (n=399)

Variable		Latrine Use	No Latrine Use	P Value	OR
Knowledge	Good	147	76	0.001	2.60
	Bad	75	101		
Attitude	Positive	153	76	0.001	2.94
	Negative	69	101		
Economic Status	High	114	61	0.001	2.0
	Low	108	116		
Latrine Condition	Good	143	87	0.002	1.8
	Bad	79	90		
Availability of clean water	Available	130	83	0.026	1.6
	No Available	92	94		
Health Officer Support	Support	135	86	0.015	1.6
	No Support	87	91		

*level of significance p<0.05, OR = Odd Ratio

Table 2 demonstrates associated independent variables with latrine use. The result using a Chi-square test showed a relationship between the knowledge level (p=0.001, OR=2.60), attitude (p=0.001, OR=2.94), economic status (p=0.001, OR=2.0), latrine condition (p=0.002, OR=1.8), availability of clean water (p=0.026,OR=1.6), health officer support (p=0.015, OR=1.6), and latrine use.

More than half (55.6%) of the respondents use latrines. To find out which factors are most related to the use of a latrine, a logistic regression analysis was done. Independent variables that were statistically significant in bivariate Chi-square tests were included in a logistic regression model. In the first model, the availability of clean water became insignificant or p (0.06), so it was issued in the model. The last model was used according to Table 3 below. The 'attitude' variable was the most dominant variable to influence the use of latrines (Adj. OR = 3.2), followed by the 'knowledge' variable (Adj. OR=2.0).

Table 3: Factors associated with latrine use: logistic regression analysis (n=399)

Variable	B	Adj. OR	95% CI Lower Limit	Upper Limit
Knowledge Level	0.695	2.003	1,292	3,107
Attitude	1.182	3.262	2,059	5,169
Economic Status	0.622	1.863	1,195	2,904
Latrine Condition	0.584	1.794	1,154	2,787
Health Officer Support	0.727	2.069	1,315	3,254
Constant	-1.994	0.136		

*OR = exp (B), 95% CI = Confidence Interval, Adj. OR = Adjusted Odds Ratio

DISCUSSION

Based on the result, more than half of the respondents used a latrine (55.6%) to defecate, compared with those who did not use latrine to defecate (44.4%). Many of the villagers (43.9%) who did not use latrine were those with low economic status (<100 USD/month). This result finding is in line with research done in Ethiopia and Ghana, which found that the economy influences respondents to sustain latrine use[27]. In this study, much of many of the villages area still have an inadequate infrastructure concerning latrines. This

finding is similar to research done in India that concluded that urgent policy reform and governmental subsidies were needed to improve access to latrines in rural areas[28].

The study found that generally when latrine use was high, the majority of the respondents exhibited good knowledge, positive attitude, good economic status, good latrine condition, and good health officer support. Based on the Chi-square test, knowledge (p=0.001), attitude (p=0.001), economic status (p=0.001), latrine condition (p=0.002), availability of clean water (p=0.026),

and health officer support (p=0.015) are all associated with latrine use. The study results are consistent with the concept and theory from Lawrence Green, which states that these variables influence the formation of individual health behaviors.

Similar findings were reported in a previous study by the Water and Sanitation Program (WSP), conducted in eight countries (i.e., Cambodia, India, Kenya, Malawi, Peru, Tanzania, Uganda, and Indonesia/East Java). The results showed that the factors that influence latrine usage included sociodemographic characteristics, opportunity (latrine access or ownership), knowledge, social support, and financial ability, along with the motivation to use the latrine[29].

A logistic regression analysis was done to find out which factors were most related to the use of a latrine. The results showed (Table 3) that the variable 'attitude' (adj. OR = 3.2) was the most dominant variable to influence the use of latrines. Specifically, we found that a positive attitude toward using a latrine makes people three times more likely to use a latrine for defecation. Similar findings were reported by Pane (2009) who observed determinants of family behavior on the use of latrines in Sukamurni village[30]. The results of that study concluded that attitude was an important variable that can affect the use of latrine (p=0.001, OR=8.5). These findings are related to the Health Belief Model (HBM) that 'attitude' shapes a person's intention to perform a behaviour[31]. A person's intention remains the best indicator that the desired behavior will occur[32].

As expected, the 'attitude' variable was evident as the most dominant to influence respondents' defecation behavior. Attitude is a constellation of knowledge, affective, and cognitive activity. This research showed that most of the respondents had a good knowledge of the health benefits of using latrines. Based on the bivariate analysis, there is a relationship between 'knowledge' and 'attitude' (p=0.001). This supports the theory that attitude is the second stage after the cognition or knowledge process to form a behaviour[33].

Similarly, there is a relationship between 'knowledge' and 'availability of a latrine' and the behavior of open defecation[34]. This is supported by research that reported that 'knowledge' is the most important factor to influence attitude[35]. A plausible deduction in the studies reviewed is that the behavior based on knowledge will be more lasting than the behavior without knowledge[24].

Attitude relates to an individual's understanding and perceptions of sanitation products and services and sanitation behaviors themselves[36]. Attitudes may not be factually correct, leading to misconceptions that can impede the adoption of safe sanitation practices. Individuals are often unaware of their attitudes, which may be positive or negative. In this research, the assessment of 'attitude' consisted of 12 questions, and the positive attitude toward using latrines over open defecation was quantified using a Likert Scale and T Scores. (The question items are detailed in the supplemental material.) Based on the results, a majority of the respondents (57.4%) had a positive attitude toward the use of latrines, but there were still respondents (76 total) who held positive attitudes but were not using latrines for defecation. The results of this research are supported by the work of another researcher, who said that the effect of attitude on behavior was smaller than vice versa[37]. The study results also indicated that the community did not consider latrines a major issue because it is traditional to defecate in the river. Based on the research, some of the respondents who worked as farmers (35.6%) defecated in the fields. The results indicated an apparent gap between attitudes and behavior that may need to be bridged in the future by encouraging communities to translate their positive attitudes toward latrines into the practice/behavior of using latrines.

Using health cadres as enumerators have a certain limitation in terms of information bias. It is difficult to collect data without empowering of health cadres, considering that the rural community is less able to trust stranger people[38]. However, Health cadres have a high probability of leading subjects to give an answer that seems right to the researcher. Therefore, further research with community engagement by the researcher being necessary to get a deeper understanding of associated factors of latrine use.

CONCLUSION

The conclusion stated that almost half of the respondent who still practicing open defecation was influenced by attitude. The findings of this study suggest to encourage communities by applying a policy against open defecation and approaching key leader and families to change their attitude into behavior in daily practices were very important. The study recommends further research on how to change attitude into the daily practice of latrine use in the study area.

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